INDIANA Epidemiology NEWSLETTER

Indiana State Department of Health

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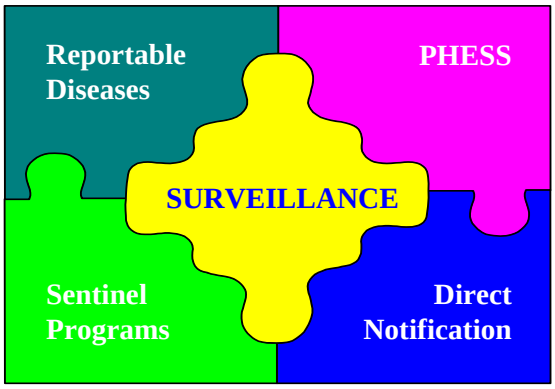
This issue of the Indiana Epidemiology Newsletter is dedicated to surveillance. Public health surveillance can be defined as the routine collection, analysis, and dissemination of all data that may be relevant for the prevention and control of a public health problem. The ISDH communicable disease surveillance system has four components: reportable disease reporting, syndromic surveillance, sentinel surveillance, and direct notification. Each of the following articles highlights one component of the surveillance system, concluding with a recent outbreak report illustrating the importance of surveillance in outbreak investigation.



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Issues in Disease Reporting

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Field Epidemiology Director

One of the first essential steps in preventing and controlling any communicable disease is quick identification and reporting. In Indiana, the Communicable Disease Reporting Rule for Physicians, Hospitals, and Laboratories is promulgated under Indiana Code 16-41-2-1. This code allows the Indiana State Department of Health (ISDH) to establish reporting, monitoring, and preventive procedures for communicable diseases. Within the rule, 410 IAC 1-2.3, there are 68 diseases and disease conditions that require reporting within established timeframes, ranging from immediately (same business day) to 72 hours, depending on the disease and its communicability, to file the reports. This rule is available online at http://www.in.gov/isdh/publications/comm_dis_rule.pdf. It is the duty of each physician and

hospital administrator to report all cases or suspected cases of any disease listed in this rule. Laboratories are also required to report results of diseases listed in this rule; however, this does not nullify the physician's or administrator's obligation to report as well. Once the report is made to the local health officer, there is an obligation to investigate the report within a reasonable timeframe. The investigation shall gather all information necessary, including disease transmission, symptoms, laboratory results, risk factors, and potential public health threats. The local health officer must also implement control measures to minimize the risk of disease spread.

In any situation where the threat of transmitting a communicable disease exists, the timely recognition, reporting, investigation, and implementation of control measures are critical to disease prevention. Knowing what to report is just as critical as knowing when to report. The 68 reportable diseases in the rule require timely reporting for a single case. However, understanding these diseases and the nature of the infection will provide a better understanding of reporting. For example, only invasive infections of *Staphylococcus, Streptococcus,* and *Neisseria meningitidis* are reportable. "Invasive" refers to the ability to "invade", or infect, tissue. Invasive microbes can enter through injured skin or through mucous membranes. If the bacteria are isolated from a sterile site where bacteria are not normally found, such as blood or cerebral spinal fluid (CSF), the infection would be considered invasive, and thus, reportable. In contrast, colonization is simply the presence of microbes on or in a person. Colonizing bacteria grow and multiply but do not invade the tissues causing disease. This condition is sometimes referred to as non-invasive. For example, *Streptococcus* can be found on the skin, in the nasal cavity, and in the back of the throat. Isolation of the bacteria from these areas would not necessarily indicate that a person is ill due to the presence of these bacteria. The same can be said of *Neisseria menigitidis*. Up to 10 percent of the population has the bacteria in the back of their throats, essentially a carrier state, and these people are not ill. These examples would not be considered reportable.

The local health officer, or duly authorized representative, must thoroughly investigate all reportable diseases. This investigation is documented by completing the appropriate communicable disease reporting form. The majority of these forms are now available online at http://www.IN.gov/isdh/form/index_hcp_forms.htm. Using these forms and answering all the questions will assist in completing the investigation. Having the forms online allows the investigator to directly enter the data on the form, print the form, and then fax it to the ISDH at 317.234.2812. This will decrease the reporting and response time. The anticipated goal is complete online reporting and data transfer; however, due to confidentiality and online security, the ISDH is still investigating methods for online reporting. Once the forms are received, the appropriate investigator reviews the reports for any common factors that may indicate related cases or emerging risk factors. Forms are periodically updated to reflect changes in risk factors and disease transmission.

An important aspect of reporting communicable disease is the dissemination of the data learned from the investigation. This is valuable for a variety reasons. The first is the addition of scientific knowledge of the disease. Disease agents mutate to survive in various environments. New serotypes or strains of disease agents could be discovered with the advancement of scientific testing. Secondly, and more importantly, disseminating the data increases the awareness level of the disease signs and symptoms which can aid in identification and treatment of additional cases. One of the biggest challenges many local health departments (LHDs) face is how to distribute this information quickly to all local health care providers. Having contact lists of providers at LHDs that can be updated periodically is essential. This information can be invaluable in a variety of circumstances, especially during public health emergencies, and needs to be easily accessible at all times. The method of distributing information via this list will differ from county to county

but remains an important tool for informing providers. In turn, local health care providers and hospitals need a method to contact LHDs at all times as well.

The Indiana Health Alert Network (IHAN) is also a valuable means of distributing information on public health emergencies, alerts, and advisories. The IHAN is a system by which the ISDH, or eventually, any LHD can distribute information about public health issues. The IHAN can distribute messages statewide as well as to surrounding states. It sends messages by voice, e-mail, and fax and is available 24 hours a day, 7 days a week. Each LHD and hospital has an IHAN Coordinator who is responsible for identifying those decision-makers and county officials who need to be notified of any public health situation. The IHAN Coordinator also establishes contacts in the county or hospital who need to initially receive an IHAN message. The IHAN system is designed to be a cascading system. Information can be initiated at federal, state, and local levels. For example, when the Centers for Disease Control and Prevention (CDC) sends an alert to states regarding an outbreak situation, the IHAN would then forward this information to all persons or agencies identified in the ISDH contact list, including LHDs. The local IHAN Coordinator or any of the local contacts can further distribute that information to their contacts, such as health care providers and hospitals, through normal routes. IHAN messages can also be tailored for a specific audience. The system is geographically oriented so that information that is pertinent to a specific geographic region can be distributed in that specific region. Information can also be tailored to those in specific professional roles. Capacity for LHDs to initiate messages within their jurisdictions should be available in early 2006. For more information on IHAN, contact Chuck Berning, ISDH IHAN Coordinator, at 317.233.8187.

Syndromic Surveillance Update

Mike Wilkinson, B.S.
Elizabeth Hibler, MPH
Dave Trepanier, MSEE

Indiana's Public Health Emergency Surveillance System (PHESS) has expanded significantly since the last update appeared in the November 2004 *Indiana Epidemiology Newsletter*. PHESS now has two electronic sources of surveillance data, hospital emergency department chief complaints and over-the-counter (OTC) drug sales, as well as school absenteeism rates. Indiana Poison Center call data will be added electronically in the near future. In addition, PHESS has a new component, a front-end alerting and analysis system developed at Johns Hopkins University called ESSENCE (Electronic Surveillance System for Early Notification of Community-based Epidemics).

Through the efforts of the Indiana State Department of Health (ISDH) PHESS team and our partner, the Regenstrief Institute, currently 39 Indiana hospital emergency departments are sending chief complaint data on a nearly real-time basis. Initially, hospitals were chosen by their ability to report electronically and their geographic location to provide adequate coverage of Indiana residents. The process of enrolling a hospital has several steps, including an on-site visit to explain the program and the signing of a data sharing agreement. The data are transmitted every three hours over a secure VPN (virtual private network) connection. An additional 24 hospitals are slated for enrollment over the next year. Indiana Code 16-19-10-8, expected to take effect in November, 2005 will require all 114 hospitals with emergency departments to transmit chief complaint data by 2011.

The National Retail Data Monitor (NRDM) program, located at the University of Pittsburgh, transmits Indiana OTC drug sales data to ISDH daily. Currently, 91percent of pharmacies in District 5 (Marion County and adjacent counties) are represented. Statewide, pharmacy coverage is 60 percent. The NRDM continues to bring additional pharmacies online.

The most visible improvement in PHESS over the past year has been the addition of the ESSENCE front-end web application. ESSENCE was originally developed to track disease outbreaks at military hospitals worldwide. Now, with funding from the U.S. Department of Homeland Security, ESSENCE is being installed in many states and regions around the country. ESSENCE provides alerting and allows epidemiologists to analyze multiple data sources using multiple detection algorithms. Incoming data sources are coded into standard disease syndromes. If the number of cases of a particular disease syndrome exceeds a baseline value for a given location, ESSENCE generates a warning or alert. There is also a GIS (geographic information system) component which allows for visualization of an outbreak on state maps. The analysis can be done based on region, hospital, and patient location.

When an ESSENCE alert occurs, ISDH epidemiologists perform further analysis, looking at time series trends and often going back to the original hospital chief complaint data. If a potential outbreak is indicated, the appropriate ISDH field epidemiologists are contacted in order to continue the investigation with local hospitals, health departments, and pharmacies.

The PHESS team is also identifying future possible data sources, including urgent care visits, nurse hotline calls, and EMS runs. These additional data sources should improve coverage and detection capabilities. Another goal of the PHESS program is to provide local data to local health departments and hospitals to view potential health events in their jurisdictions. Currently, Marion County Health Department is using data provided by the PHESS.

Influenza Sentinel Surveillance

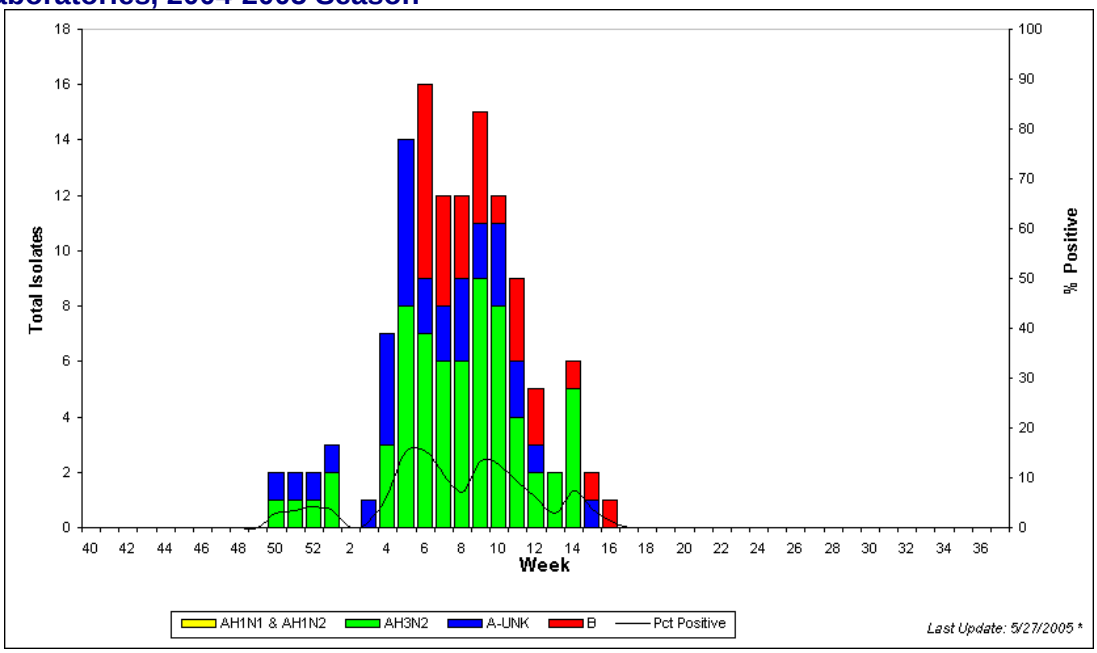
Shawn M. Richards, B.S.
Respiratory Epidemiologist

The Indiana State Department of Health (ISDH) uses six different surveillance components to describe influenza activity in Indiana. These complementary surveillance components assist in determining where, when, and what influenza viruses are circulating. The surveillance components are also used to determine if influenza activity is increasing or decreasing. However, the components do not ascertain exactly how many people in Indiana have become ill with influenza. The six components of influenza surveillance used in Indiana are:

1. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS)
2. U.S. Influenza Sentinel Provider Surveillance
3. 122 Cities Mortality Reporting System
4. State and Territorial Epidemiologists Report
5. Influenza Associated Pediatric Mortality Surveillance
6. Public Health Emergency Surveillance System (PHESS)

The **WHO and NREVSS Surveillance** component consists of 75 WHO and 50 NREVSS collaborating laboratories located throughout the U.S. that report to the U.S. Centers for Disease Control and Prevention (CDC) the number of respiratory specimens tested and the number positive for Influenza A or B each week. The ISDH Laboratory and other laboratories in Indiana participate in this surveillance network. Figure 1 is a bar graph that shows Indiana's influenza subtypes, number of specimens, and the percent positive for influenza for the 2004-2005 influenza season.

Figure 1. WHO Isolates from Indiana Reported by WHO/NREVSS Collaborating Laboratories, 2004-2005 Season



***All data are preliminary and will change as more reports are received.**

The **U.S. Influenza Sentinel Provider Surveillance** component consists of 1,000 health care providers around the country who report the number of patients seen in their offices and the number of patients with influenza-like illness (ILI) on a year round basis. For the purpose of surveillance by the CDC, ILI is defined as, "Fever (> 100^0F [37.8^0C] oral or equivalent) and cough or sore throat (in absence of a known cause)." Indiana sentinel sites include private physicians' offices, nurse practitioners, local health departments, hospital emergency departments, urgent care facilities, and universities.

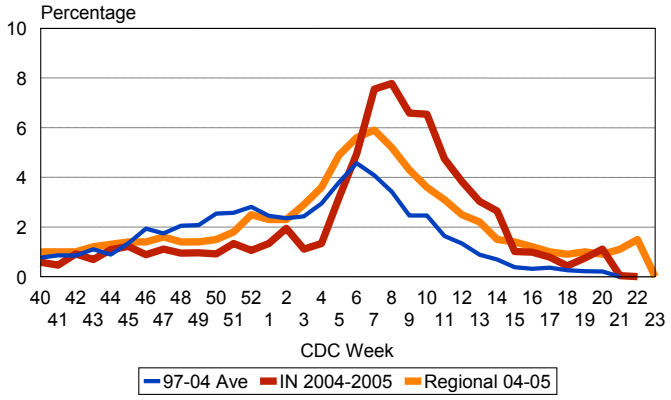
Sentinel sites submit weekly reports regarding patient visits and ILI to a repository at the CDC via Internet, phone, or fax. Additionally, sentinel participants collect nasopharyngeal swabs from patients with ILI whose onset of classic clinical signs started within 72 hours of the appointment. The swabs are sent to the ISDH Laboratories for viral isolation, and viruses are identified by indirect or direct fluorescent antibody (IFA or DFA) and polymerase chain reaction (PCR) methods. The ISDH provides the sentinel sites with viral submission kits, delivery of kits to the sentinel site, overnight shipping from the site to the ISDH Laboratories, regular reports of influenza incidence in Indiana and the nation, educational opportunities regarding influenza and

pandemic influenza, and a subscription to the *Journal of Emerging Infectious Disease* free of charge. Sentinel sites that regularly report their data will receive a certificate from the CDC and the ISDH.

This past season, sentinel sites were provided with complimentary rapid flu tests and viral care packages. The rapid tests, however, were not to replace viral specimen submission to the ISDH Laboratories. The viral care packages consisted of a thermometer, temperature log, soap, tissues, water, chicken soup, throat lozenges, an antipyretic, saline nasal spray, and an explanation of why antibiotics are not prescribed for viral illnesses.

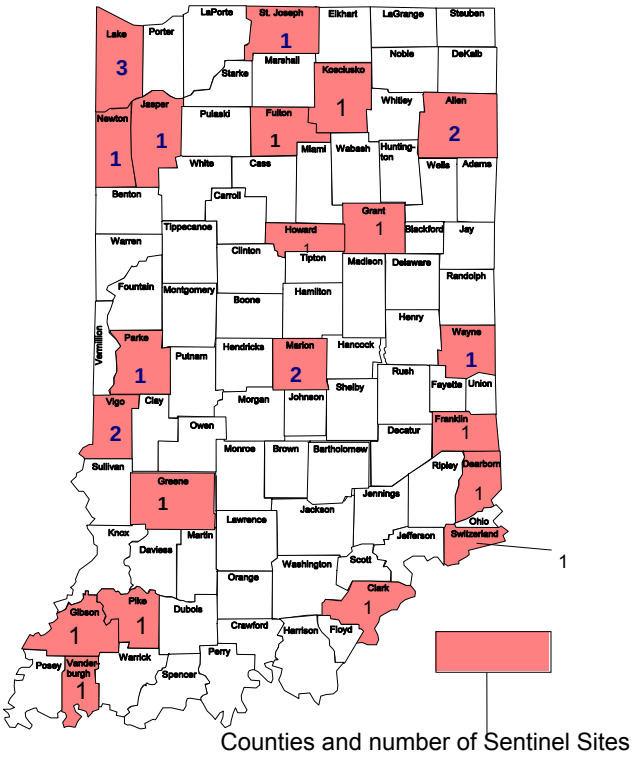
The data that the sentinel sites provide to the CDC help the ISDH monitor the incidence of influenza in Indiana. The ISDH has embraced the enhanced surveillance initiative of year-round reporting due to the need to be prepared when a novel influenza virus emerges which could start a possible pandemic. This can occur any time of year. Figure 2 is a line graph that displays the percentages of patients seen at the sentinel sites from October, 2004 to present.

Figure 2. Percentage of Patients Seen with Influenza-Like Illness, 2004-2005



Currently, Indiana has 31 sentinel sites located throughout different parts of the state. Figure 3 depicts the counties and number of sentinel sites recruited in each county.

Figure 3. Influenza Sentinel Sites, 2005-2006



The ISDH would like to recruit at least 50 sentinel sites throughout Indiana in an effort to obtain appropriate geographic data. The ISDH extends a special thank you to the following sentinel sites that have a 100 percent reporting record:

- Allman Family Practice
- Jeffersonville Pediatrics
- Dr. Carl Kuenzli
- Switzerland County Nurse Managed Clinic
- Indiana State University Health Center
- Brookville Medical Clinic
- Notre Dame University Health Services
- Redimed N.E. of Allen County
- Dr. Jerrold Smith

The dedication and diligence that these sentinel sites have displayed are truly honorable, and these sentinels should be proud of their accomplishment. Health care providers interested in becoming a sentinel site should contact Shawn Richards at srichard@isdh.in.gov.

The third surveillance component is a **Mortality Reporting System** located in 122 cities in the United States. The vital statistics offices of 122 U.S. cities report the total number of death certificates filed in their city and the number of those for which pneumonia or influenza was listed as the underlying contributing cause of death. The percentage of all deaths due to pneumonia and influenza are compared with a baseline and epidemic threshold value calculated

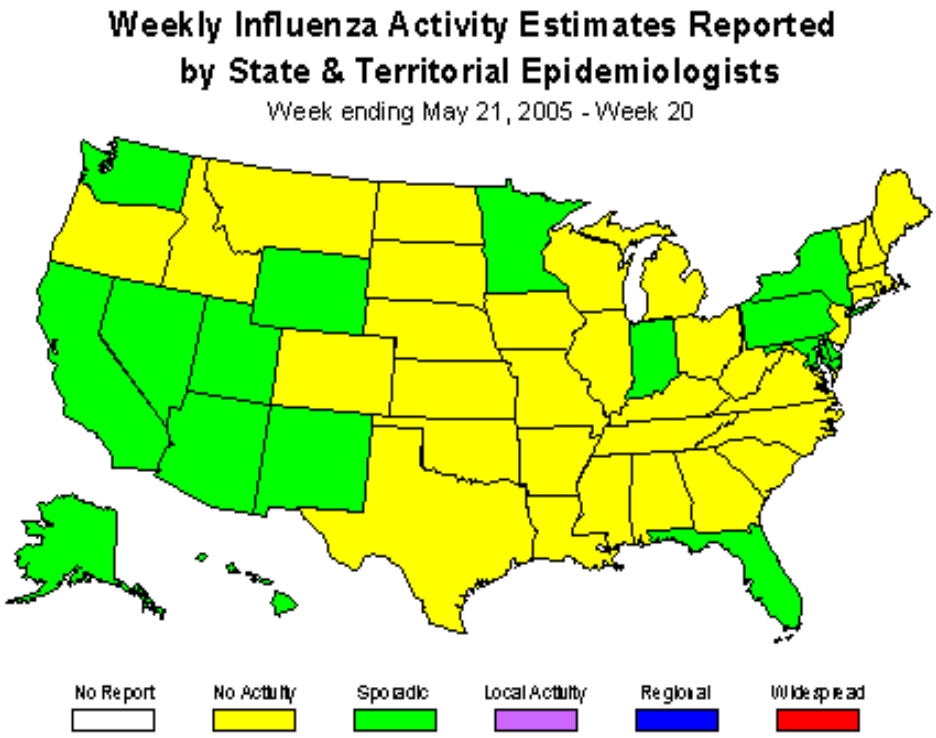
for each week. Several cities in Indiana report their data to the CDC. The ISDH monitors the data reported as part of the comprehensive surveillance program

The fourth component is the **State and Territorial Epidemiologists Report.** State health departments report to the CDC the estimated level of activity in their states each week. The levels are reported as:

- **No activity**: No lab-confirmed cases of influenza and no reported increase in the number of ILI.
- **Sporadic:** Small numbers of laboratory-confirmed influenza cases of a single outbreak have been seen, but no increase in ILI.
- **Local:** Outbreaks of influenza or increases in ILI cases **and** recent lab-confirmed influenza in a single region of the state.
- **Regional**: Outbreaks of influenza or increases in ILI and recent lab-confirmed influenza in at least 2 but less than half of the regions of the state.
- **Widespread**: Outbreaks of influenza or increases in ILI cases and recent lab-confirmed influenza in at least half the regions of the state

Figure 4 is a map of the data collected from the State and Territorial Epidemiologists Report.

Figure 4.



The fifth component of the influenza surveillance program is the **Influenza-Associated Pediatric Mortality Report**. Influenza-associated deaths and severe illness (encephalitis, behavioral change) in children under 18 is newly reportable in all states. Influenza association is defined as positive for Influenza A or B by viral culture (IFA, DFA, PCR) or by rapid testing method. The deaths are reported to the CDC via a secure data network. Indiana had two pediatric deaths

reported in 2005. As of May 25, 2005, pediatric deaths have been reported to CDC from 14 states (California, Colorado, Florida, Georgia, Indiana, Iowa, Maine, Massachusetts, Mississippi, New Jersey, New York, Ohio, Pennsylvania, and Vermont) and New York City; all deaths were reported during January-May.

The final component of the surveillance system is the ISDH **PHESS** (see previous article). This syndromic surveillance system issues alerts if thresholds are exceeded for hospital emergency department chief complaint syndromes, including respiratory, and over-the-counter retail drug sales, including respiratory syndrome drugs. If an alert is generated for the same location for the same syndrome over three consecutive days, the appropriate ISDH field epidemiologist contacts the local health department of jurisdiction to determine if an outbreak is occurring.

Influenza surveillance is a complex, multifaceted system. One part cannot stand alone, but analyzing the data from several different components creates a general picture about influenza incidence in Indiana.

OUTBREAK SPOTLIGHT....

"Outbreak Spotlight" is a regularly appearing feature in the *Indiana Epidemiology Newsletter* to illustrate the importance of various aspects of an outbreak investigation. The event described below illustrates how direct notification of a disease case can trigger an outbreak investigation, indicates the importance of interstate cooperation, and demonstrates the critical role surveillance plays in outbreak investigations.

Measles Outbreak in Indiana – 2005

Wayne Staggs, MS
Vaccine-Preventable Disease Epidemiologist

Introduction

On May 29, 2005, the Indiana State Department of Health (ISDH) was notified of a six-year-old female Indiana resident hospitalized in the Cincinnati Children's Hospital Medical Center with a suspected diagnosis of measles. Serological analysis performed by both the Ohio State Department of Health Laboratory and a private reference laboratory confirmed the measles diagnosis. The Cincinnati Children's Hospital Medical Center and the child's parents informed the ISDH that she attended church in northwestern Indiana on May 15, 2005, when a church

member who had recently visited Romania was ill with rash and fever (the index case). The investigation that followed identified an additional 33 cases, either laboratory confirmed or epidemiologically linked to the index case. This report summarizes the results of this outbreak and the control measures taken to prevent further transmission.

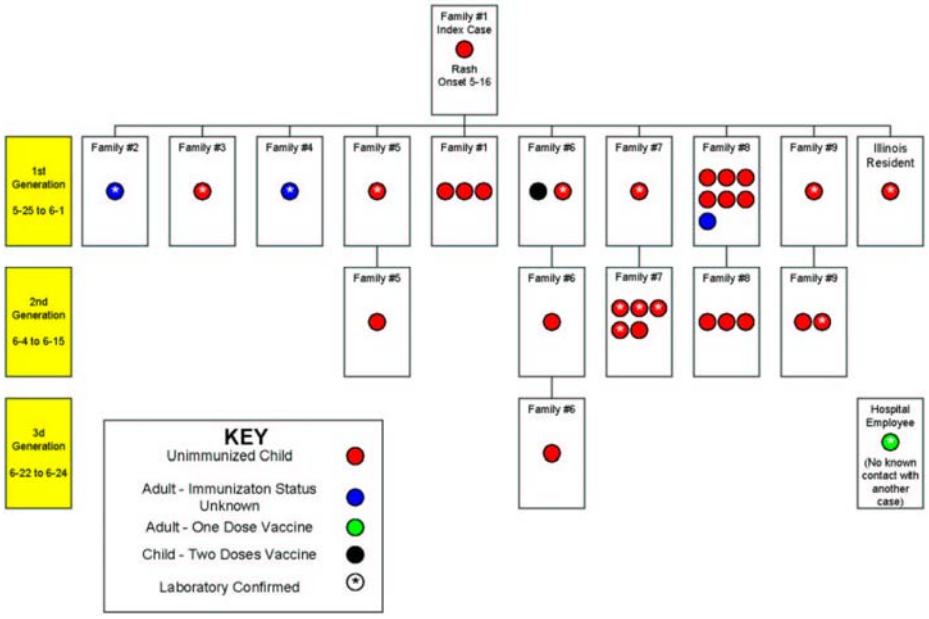
The index patient, a 17-year-old unimmunized female, had traveled to Romania from May 4-14, 2005, where she had worked in an orphanage and a hospital. She returned to the U.S. with prodromal fever, cough, conjunctivitis, and coryza on international (Romania to Netherlands to Detroit) and domestic (Detroit to Indianapolis) commercial airlines flights on May 14. She attended church on May 15 and developed a maculopapular rash on May 16.

Many members of this church, particularly children, were unimmunized, allowing for exposure of susceptible individuals during church activities on May 15. Officials of the church initially reported that six church families (including those of the index case and the case hospitalized in Ohio) had cases of measles in family members. One of the six families lived in Illinois, and the Illinois State Health Department was notified for follow-up of that case. Through reporting by the local medical community, three additional church families were identified with at least one case each. A neighbor of the index case was also identified as a case during the first generation. During the third generation, a hospital employee, whose direct source could not be identified, was also confirmed as a case. In summary, nine church families had a total of 30 cases, one neighbor family had 3 cases, and 1 case occurred in a local hospital employee.

Case and Household Information

A breakdown of cases by generation and lab confirmation can be seen in Figure 1. Three generations of cases occurred following the index case.

Fig. 1 Measles Cases by Generation
Immunization Status/Laboratory Confirmation
Indiana May-June, 2005



- **Index Case** – Rash onset occurred on May 15.

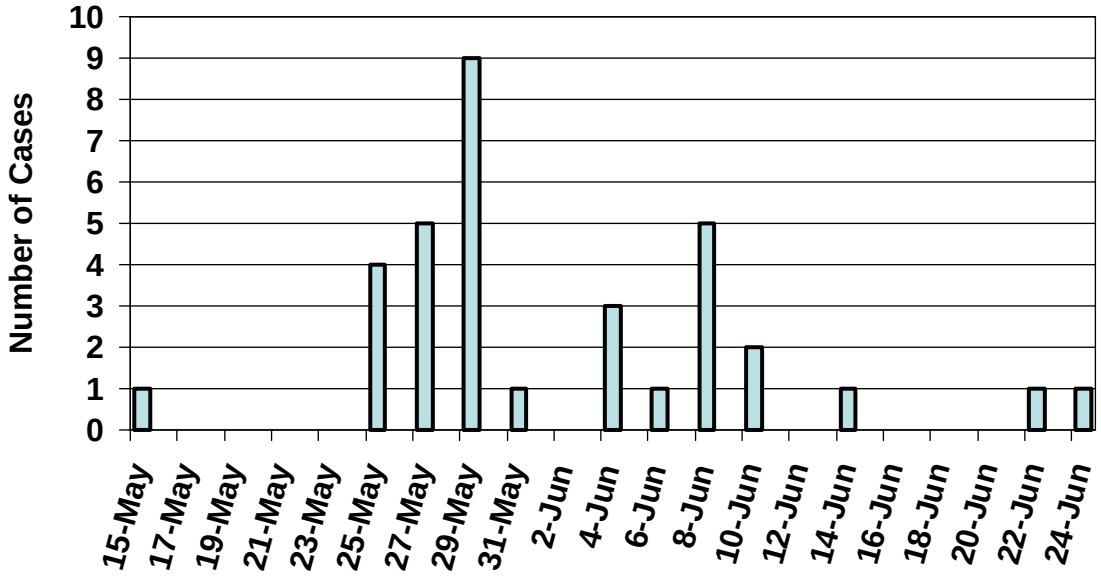
- **First Generation** – Rash onsets during the first generation ranged from May 25-June 24. There were 19 total cases in this generation, all exposed at the church.

- **Second Generation** – Rash onsets ranged from June 4-June 15 during the second generation. There were a total of 12 cases during this generation, all exposed by first generation church or neighbor family cases.

- **Third Generation** – Rash onsets during the third generation ranged from June 22-24 for a total of 2 cases. One of these cases was the hospital employee for whom a source was not identified. The other was a member of a family that had experienced cases during the first and second generations.

The outbreak lasted six weeks, with three generations occurring from the index case rash onset of May 16 to the last rash onset occurring on June 24. Figure 2 shows the rash onset by date.

Figure 2. Measles Cases by Day of Rash Onset Indiana*, May-June 2005



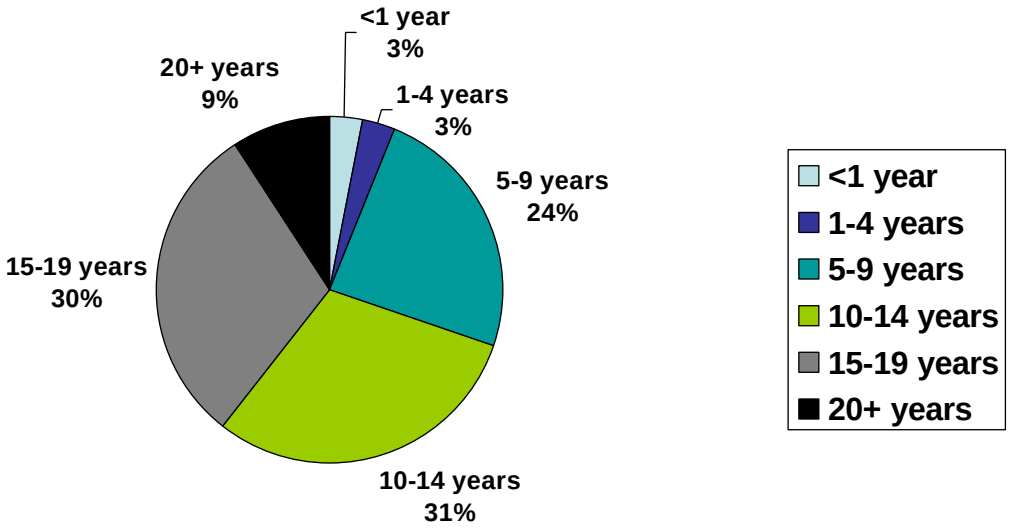
Each day on X axis represents two-day period (e.g., May 15 includes May 16 also)
*One case occurred in Illinois

Cases occurred in three adjacent counties in northwestern Indiana and one county in northeastern Illinois. The majority of cases (17) occurred in three families living in the same county. Fifteen cases (in six families) were residents of a different county, and one case occurred in a third county.

Cases ranged in age from less than 1 year to 49 years. Figure 3 shows the distribution of cases by age group. Twenty-four cases (70.6%) were female and 10 cases (29.4%) were male. Thirty-three cases (97.1%) were white, non-Hispanic; and one (2.9%) was an Asian/Pacific Islander.

Three of the cases were hospitalized, including the first case reported from Cincinnati Children's Hospital Medical Center. Pneumonia (one case) and dehydration (two cases) were the reasons for hospitalization. One hospitalized adult required intensive care management, including ventilator support, for six days. Other complications among non-hospitalized cases included: diarrhea – 16 cases (47.1%) and otitis media – two cases (5.9%).

Figure 3. Confirmed Cases in Measles by Age Group−Indiana* May−June, 2005

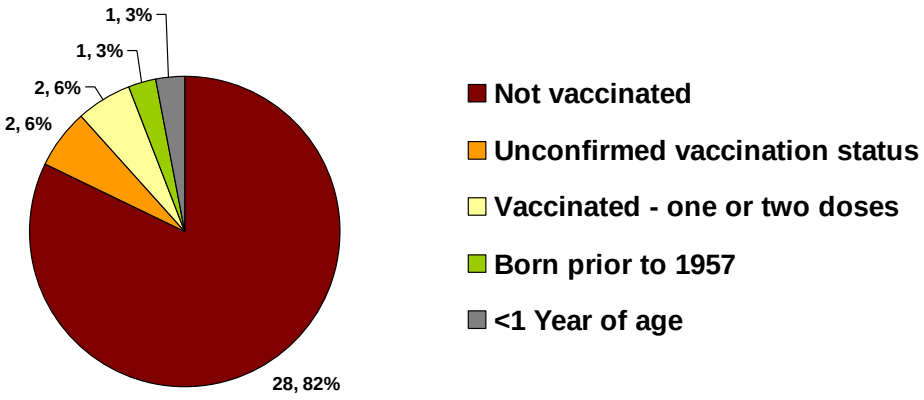


N = 34
*One case occurred in Illinois

Vaccination Status of Cases and Family Members

Twenty-eight (82.4%) of the cases had no history of disease or measles vaccination. The age of these 28 cases ranged from 4 years to 18 years. One case was born prior to 1957 (presumed immune from natural disease in childhood), one case had a two-dose history of measles vaccine, one case had one dose of measles vaccine, one case was less than one year of age, and the vaccine status was unknown in two cases. Figure 4 depicts the immune status of cases.

Figure 4. Vaccination Status of Confirmed Cases
Measles Outbreak—Indiana*
May–June 2005



* One case occurred in Illinois

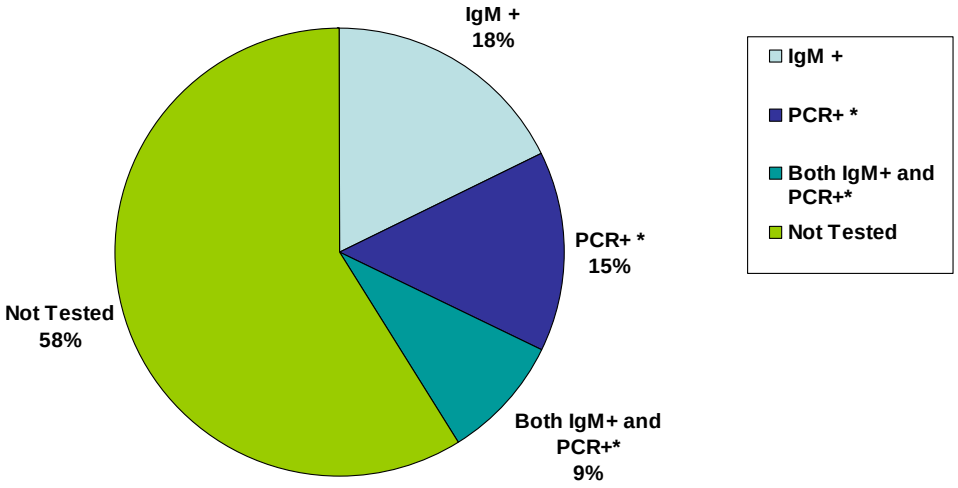
The immune status of all 68 family members in the 11 households with measles cases was determined during the investigation. Thirty individuals in the 11 households were known to be unvaccinated, for an attack rate of 93.3 percent (28/30) among non-vaccinated individuals. Thirty-eight other persons in these households who did not develop disease had one or two doses of vaccine, were born prior to 1957, or had an unknown disease or vaccine history.

Laboratory Summary

The earliest laboratory confirmation of disease occurred when two cases tested IgM antibody positive at the ISDH Immunology Laboratory on June 1. Fourteen cases (41.2%) were laboratory confirmed either by IgM serological analysis, polymerase chain reaction (PCR) analysis of urine specimens, or both. Nine cases were confirmed serologically and eight cases were confirmed by PCR. Three of the cases were positive both serologically and by PCR analysis. PCR analysis conducted by the Centers for Disease Control and Prevention indicated the genotype to be D4. Nine of the 11 affected families had at least one case confirmed by either serology or PCR. Figure 5 depicts the laboratory status of the 34 cases.

Figure 5. Laboratory Confirmation of Cases

Indiana* Measles Outbreak, May-June, 2005



n=34

*All PCR+ yielded genotype D4

*One case occurred in Illinois

Actions

Upon notification of the initial case hospitalized in Cincinnati, the ISDH spoke with church officials, who were aware of six other cases among church members. All families identified by the church were contacted to determine how many cases were present, the immune status of other family members, and other possible exposures by ill family members. Each family was advised about isolation recommendations (four days following rash onset) for infected individuals and agreed to voluntarily quarantine (7–18 days following exposure to fever) other non-immune family members. Three additional measles cases were reported by the medical community in the outbreak area on May 31 (one) and June 2 (two). On May 31, a neighbor family of the index case was reported to have one case in that household. These families were provided the same recommendations and were followed by public health officials in the same manner as the initial six cases that were identified by the church.

Prior to the June 5 and 12 services, church officials issued a statement encouraging vaccination of members. They also cancelled all youth activities for those two Sundays and asked non-immune members not to attend church on those two Sundays. Compliance with these recommendations apparently was achieved, as there were no cases reported in church members outside of the original nine families. There was also no disease transmission from the neighbor family or the hospital employee.

Measles alerts were issued to the medical community in counties with reported cases on June 1, 2005, with an updated alert issued on June 9. Two medical alerts were also sent to health care providers in areas adjacent to the Indiana counties with cases and to counties where church members were likely to reside. A statewide press release was also issued on June 1. As a result

of heightened awareness in the affected communities, 32 suspected cases were reported to the local and state health departments, all of which were ruled out as measles by serological analysis. Also, as a result of increased awareness in the community, 111 doses of MMR vaccine were administered by local health departments.

Exposures to cases during their contagious periods occurred several times in various types of health care facilities, including hospitals, urgent care centers, and physician offices. No documented spread occurred from exposures at health care facilities, but many control measures were initiated as a result of these exposures. Most of the facilities and offices followed up by notifying patients and staff of the exposures. Those exposed were asked about their immune status, received information describing symptoms, and received recommendations for what to do if symptoms developed.

Two measles exposures occurred at one hospital with approximately 1,300 employees. The first exposure occurred from contact with a hospitalized infected patient. This resulted in 75 staff and 75 patients being notified of exposure and 371 employees subsequently immunized with MMR vaccine. The second exposure, which occurred during the third generation, resulted in 200 employees and 306 patients requiring notification and follow-up. In this situation, an infected employee worked during the prodromal period from June 19 to 23. Upon employment at the hospital, the employee had reported receiving two doses of vaccine, but no written documentation was provided. Due to the nature of the employee's responsibilities, all individuals who may have been exposed could not be accurately identified.

Since there was inadequate documentation of immune status from employee health records, it was recommended that immunoglobulin (IG) be offered to those exposed employees with no verified proof of immunity who could receive a dose within eight days of possible exposure. As a result of this recommendation, 174 employees were given IG. In addition, the hospital initiated daily screening (at shift changes) of all staff for rash and fever on July 6. Approximately 225 employees were screened each day until the incubation period for exposure had passed. During the time periods following these two hospital exposures, 481 employees were tested for immunity to measles; 21 (4.4%) were found to have no immunity and received MMR vaccine.

Comments

This measles outbreak was the largest in Indiana since 1990 and the largest in the United States since 1996. Significant amounts of resources, money, and time were spent controlling this measles outbreak, which would have been entirely preventable if the index case who traveled to Romania had been adequately immunized prior to travel.

- This outbreak underscores the need for organizations coordinating the travel of Americans to other countries to require proof of adequate immunization or immune status prior to travel.
- It also illustrates the need for continued effort in locating and encouraging immunization among groups with low vaccine coverage rates, whether these be faith-based organizations or otherwise.
- The outbreak emphasizes the need for health care facilities and employees to be aware of vaccine-preventable disease immune status, with employee health services requiring written documentation of employee immunization history or immune status. Health care employers and employees should utilize and follow the recommendations contained in the document entitled Immunization of Health-Care Workers: Recommendations of the

Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory.

Thank You…..

The Indiana State Department of Health (ISDH) wishes to thank all individuals and groups who assisted in controlling this measles outbreak. Enormous amounts of time and effort were needed to manage the type of activities required to contain this highly contagious illness. Specifically, the ISDH would like to thank the Tippecanoe, Clinton and White County Health Departments for their efforts. Home Hospital and St. Elizabeth's Hospital and all the medical and health care providers in the area are also to be congratulated for their efforts. Without the assistance of the dedicated employees of these organizations, the outbreak would not have been contained as well and as quickly as it was.

The Epidemiology Resource Center (ERC) wishes to acknowledge the ISDH Immunology and Virology Laboratories for their timely processing, testing and reporting of all specimens that were submitted. The ERC also thanks Adam Younce, ISDH Immunization Program, for the creation of the Measles Cases by Generation flow chart (Figure 1), which he produced for this article.

Editor's Note: The following is excerpted from an article published in the Oct 28, 2005 issue of the CDC Morbidity and Mortality Weekly Report. The entire article may be viewed at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5442a1.htm.

Editorial Note: The measles outbreak described in this report was the largest in Indiana since 1990 and the largest in the United States since 1996 (*1*, *2*). The outbreak resulted from a gathering of church members who had not been vaccinated for measles and could have been prevented if the index patient, an Indiana resident, had been adequately vaccinated before traveling to Romania.

Measles is a highly infectious acute viral illness that can cause severe pneumonia, diarrhea, encephalitis, and death. Although an effective vaccine has been available for approximately 30 years, an estimated 30–40 million measles cases and 530,000 deaths from measles occur annually worldwide (*3*). Ongoing measles transmission has been eliminated in the United States by high vaccination levels (*4*). As with the outbreak in Indiana, 362 (67%) of 540 measles cases in the United States during 1997–2001 were linked to imports (i.e., 196 imported cases, 138 cases epidemiologically linked to imported cases, and 28 cases associated with an imported measles virus genotype), and most measles cases could have been prevented (*5*). Because the disease is endemic or epidemic in many parts of the world (*6*), the Advisory Committee on Immunization Practices (ACIP), recommends that all persons who travel internationally be vaccinated for measles to reduce the risk for infection among travelers (*7*). ACIP further recommends that all preschool children in the United States receive 1 dose of MCV [measles-containing virus] and all school-aged children receive 2 doses of MCV. Although all states require 2 doses of MCV for children attending school, nonmedical exemptions are permitted by certain states, including Indiana. Persons choosing a nonmedical exemption from vaccination are approximately 22 times more likely to acquire measles than persons who are vaccinated and also increase the risk for measles disease for those who are vaccinated (*8*). Parents and persons who opt out of vaccination should be aware of the risk that this practice places upon their children and their community. Communities of persons who have not been vaccinated can make intensive measles-containment activities necessary (*9*).

ACIP also recommends that persons who work in medical facilities be vaccinated for measles (*10*). The Indiana outbreak, in which patients included a hospital worker, emphasizes the need for health-care facilities to be aware of the vaccination status of their workers and require written documentation of vaccination history.

The Indiana outbreak could have been prevented by adherence to long-standing ACIP recommendations calling for measles vaccination of 1) international travelers, 2) children, and 3) health-care workers. The serious illnesses that resulted from this outbreak and the size and scope of activities and resources required to contain it underscore the need to adhere to these recommendations to sustain elimination of measles in the United States.

Acknowledgments
This report is based, in part, on contributions by: the Tippecanoe County Health Department, Lafayette; Immunology and Virology Laboratories, Epidemiology Resource Center, and Immunization Program, Indiana State Department of Health; Hamilton County General Health District, Cincinnati Health Department, Ohio; and the Illinois Department of Health.

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Training Room

INDIANA STATE DEPARTMENT OF HEALTH IMMUNIZATION PROGRAM PRESENTS:
Immunizations from A to Z

Immunization and Health Educators offer this FREE, one-day educational course that includes:

- Principles of Vaccination
- Childhood and Adolescent Vaccine-Preventable Diseases
- Adult Immunizations
  - Pandemic Influenza
- General Recommendations on Immunization
  - Timing and Spacing
  - Indiana Immunization Requirements
  - Administration Recommendations
  - Contraindications and Precautions to Vaccination
- Safe and Effective Vaccine Administration
- Vaccine Storage and Handling
- Vaccine Misconceptions
- Reliable Resources

This course is designed for all immunization providers and staff. Training manual, materials, and certificate of attendance are provided to all attendees. Please see the Training Calendar for presentations throughout Indiana. Registration is required. To attend, schedule/host a course in your area or for more information, please contact **Beverly Sheets at 317-502-5722 or** hepbbev@aol.com or http://www.in.gov/isdh/programs/immunization.htm

Last Chance for APIC Course Series

Attention APIC Chapter Presidents, State Hospital Associations, and Public Health Departments: The Association for Professionals in Infection Control and Epidemiology (APIC) is holding the last 2005 offering of the Infection Control and Epidemiology course series. The courses will take place November 7-10, 2005 at the Hyatt Regency in Indianapolis. The early bird registration

deadline has been extended to Friday, October 14, 2005. The ICE 2 course is sold out; however, there is room still available for the ICE 1 course. For more detailed information, visit http://www.apic.org/Content/NavigationMenu/Education/Courses/ICE_1_Registration_Indianapolis_IN.pdf and http://www.apic.org/Content/NavigationMenu/Education/Courses/Ice2_RegFormv2_Indiana-New.pdf

There will be a short pretest and posttest to measure competency gained by participating in the program. Participants will receive the pretest as an electronic survey between October 31 and November 4. The posttest survey will be e-mailed to participants the week of November 14.

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.in.gov/isdh/dataandstats/data_and_statistics.htm

HIV/STD Quarterly Reports (1998-June 05)	Indiana Mortality Report (1999, 2000, 2001, 2002, 2003)
Indiana Cancer Incidence Report (1990, 95, 96, 97, 98)	Indiana Infant Mortality Report (1999, 2002, 2003)
Indiana Cancer Mortality Report (1990-94, 1992-96)	Indiana Natality Report (1998, 99, 2000, 2001, 2002, 2003)
Combined Cancer Mortality and Incidence in Indiana Report (1999, 2000, 2001, 2002)	Indiana Induced Termination of Pregnancy Report (1998, 99, 2000, 2001, 2002, 2003)
Indiana Health Behavior Risk Factors (1999, 2000, 2001, 2002)	Indiana Marriage Report (1995, 97, 98, 99, 2000, 2001)
Indiana Health Behavior Risk Factors (BRFSS) Newsletter (9/2003, 10/2003, 6/2004, 9/2004, 4/2005, 7/2005)	Indiana Infectious Disease Report (1997, 98, 99, 2000, 2001)
Indiana Hospital Consumer Guide (1996)	Indiana Maternal & Child Health Outcomes & Performance Measures (1990-99, 1991-2000, 1992-2001, 1993-2002)
Public Hospital Discharge Data (1999, 2000, 2001, 2002, 2003)	

HIV Disease Summary

Information as of August 30, 2005 (based on 2000 population of 6,080,485)

HIV - without AIDS to date:

355	New HIV cases from October 2004 thru August 2005	12-month incidence	5.84 cases/100,000
3,579	Total HIV-positive, alive and without AIDS on August 30, 2005	Point prevalence	58.87 cases/100,000

AIDS cases to date:

401	New AIDS cases from October 2004 thru August 2005	12-month incidence	6.60 cases/100,000
3,758	Total AIDS cases, alive on August 30, 2005	Point prevalence	61.81 cases/100,000
7,737	Total AIDS cases, cumulative (alive and dead)		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in August *MMWR* Weeks 31-35		Cumulative Cases Reported January -August *MMWR* Weeks 1-35	
	2004	2005	2004	2005
Campylobacteriosis	92	64	266	268
Chlamydia	2,033	1,941	12,314	13,344
E. coli O157:H7	13	9	33	36
Hepatitis A	7	8	36	36
Hepatitis B	11	4	31	31
Invasive Drug Resistant *S. pneumoniae* (DRSP)	10	5	110	146
Invasive pneumococcal (less than 5 years of age)	3	3	30	47
Gonorrhea	831	802	4,411	5,352
Legionellosis	8	1	31	13
Lyme Disease	12	7	17	19
Measles	0	33	0	33
Meningococcal, invasive	2	2	16	16
Pertussis	13	28	65	201
Rocky Mountain Spotted Fever	1	1	5	2
Salmonellosis	104	86	340	371
Shigellosis	40	58	133	102
Syphilis (Primary and Secondary)	7	4	42	44
Tuberculosis	14	14	85	90
Animal Rabies	2 (bats)	3 (bats)	7 (6 bats, 1skunk)	10 (bats)

For information on reporting of communicable diseases in Indiana, call the *ISDH Epidemiology Resource Center* at 317.233.7125.

Indiana
Epidemiology
Newsletter

The *Indiana Epidemiology Newsletter* is published by the Indiana State Department of Health to provide epidemiologic information to Indiana health professionals and to the public health community.